

*** DIGI-STORE**

ON

READ

OFF

WRITE

RESET

TRAK ELECTRONICS CO. INC.
WILTON, CONNECTICUT

*** LOW COST ANSWER**

**TO HIGH SPEED DIGITAL COMMUNICATIONS
AND DATA HANDLING**

DIGI-STORE DS-1

A HIGH-SPEED, ASYNCHRONOUS MAGNETIC READ/WRITE UNIT

THAT SUPERSEDES PAPER TAPE PUNCHES

PROVIDES LOWER COST, MORE EFFICIENT PERFORMANCE FOR DIGITAL COMMUNICATIONS... COMPUTER INPUT... TELEMETRY... BUFFER STORAGE... MACHINE PROGRAMMING

- Performs either read or write functions at asynchronous speeds up to 300 cps (3000 wpm)
- Up to 8 recording channels for meeting modern code requirements
- Lower in cost than many slower paper tape systems — far lower in cost than systems of comparable speed
- Over 6 times the recording density of punched paper tape
- Electrically compatible with existing standard paper tape systems
- Magnetic tape can be used repeatedly without erasing
- Combination of two units simplifies change requirements
- Solid-state reliability — a minimum of modular construction
- No paper tape chad problem or jamming
- Positive double-sprocketed input and output — no bit drop problems

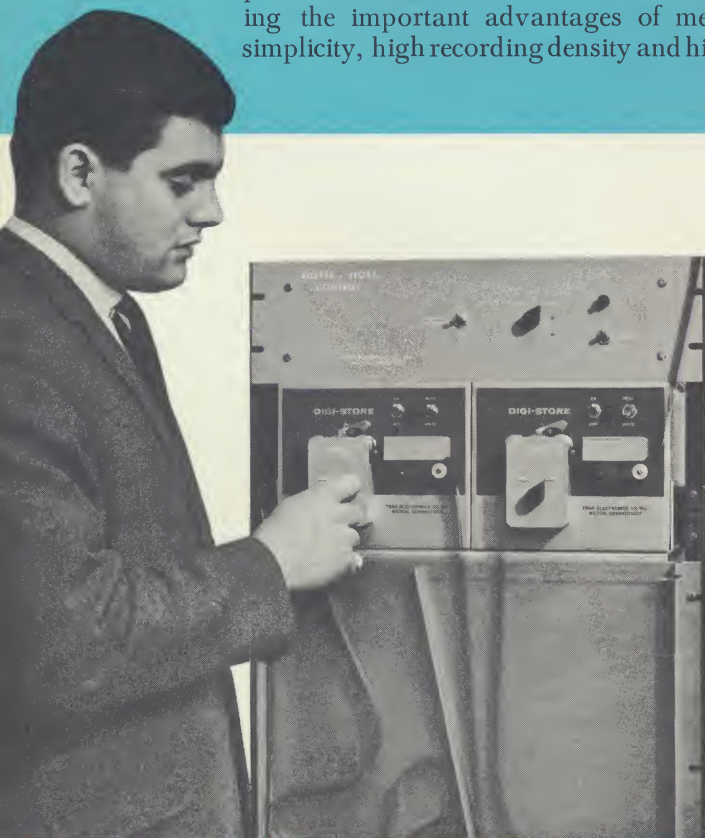
DIGI-STORE is a revolutionary development in the field of incremental data recording and reading. Its unique capabilities, low cost, high reliability, and compactness make it an ideal solution to the problems and limitations that characterize much of today's paper tape equipment.

Basically, the DS-1 is a digital magnetic tape recorder and playback machine for binary coded characters of eight levels or less. Eight separate read/write channels are provided, one for each code level. While offering the important advantages of mechanical simplicity, high recording density and high speed

of magnetic tape devices, the DS-1's character-by-character stepping capability exceeds that of paper tape equipment. It may be used as a functional replacement for punch and reader.

Unlike most paper tape devices, the DS-1 attains asynchronous reading and writing speed up to 300 characters per second (3000 words per minute). Recording density is 66-2/3 characters per inch — over six times that of punched tape.

The unit is fully compatible electrically with standard paper tape punch and reader systems. When recording, bit-



VERSATILE BUFFER STORAGE AND RATE CHANGE CAPABILITIES

A combination of two DS-1 units — one operating in the "write" mode, the other in the "read" mode — plus a connecting, continuous tape loop and necessary electronic control logic, offer many opportunities for the marriage of digital systems of different rate capabilities. For example: The tying together of 100 wpm input and 50 wpm output teletypewriter systems.

Because of the high packing density of the DS-1, a Trak buffer store unit is capable of storing 40,000 characters on a 50-foot loop of tape, spliced by a special technique that enables accurate recording directly over the splice itself. Reels may be used for increased storage capacity.

Digi-Store system for receiving, buffering, and playback of weather systems telemetry data.

MAGNETIC TAPE

STORES AND READERS

PERFORMANCE IN INPUT-OUTPUT... PROGRAMMING

satisfies buffer storage and data rate

minimum of moving parts —

no tape bulk — no punch wear

indexing eliminates tape skewing and

parallel input signals of 0 volt and -10 volt levels are used. Playback outputs are also bit parallel at essentially the same levels. Solid-state circuits are used throughout and maximum current demand is 0.75 ampere at 120 volts, 60 cps, single phase.

Positive indexing for recording and playback is obtained by a stepping motor with a double-sprocketed drive wheel. Each motor step moves standard double-sprocketed 16 mm tape exactly one character position so that playback always begins at the start of a character recording.

Only four front-panel controls are used in operating



the DS-1 and a special two level "tight-tape" sensor prevents the tape from breaking if accidentally bound. Construction features such as plug-in circuit cards, only three main moving parts, and Trak's widely-acclaimed "basket" type packaging for ready accessibility of all parts, make for simple maintenance.

A FEW CURRENT DIGI-STORE APPLICATIONS

- ACQUISITION, STORAGE AND READOUT OF WEATHER SYSTEM RADIOSONDE DATA.
- SIMILAR HANDLING OF TELEMETRY DATA IN GEOGRAPHICAL CONTOUR STUDIES.
- SINGLE UNIT REPLACEMENT OF BOTH PAPER TAPE PUNCH AND READER IN DATA SET TELEPHONE LINE COMMUNICATIONS.
- TRANSMISSION, ACQUISITION, STORAGE, AND READOUT OF NEWS MEDIA COPY.
- DATA ACQUISITION AND HANDLING IN MISSILE TEST PROGRAMS.
- PRODUCTION AND INVENTORY CONTROL APPLICATIONS.
- DATA HANDLING FOR AIRLINE RESERVATION AND STOCK AND BOND CONFIRMATION SYSTEMS.
- MANY BUSINESS AND OFFICE APPLICATIONS REQUIRING HIGH SPEED HANDLING OF DIGITAL DATA.

EQUIPMENT REQUIREMENTS FOR DATA SET SYSTEMS SIMPLIFIED

In Data Set and similar applications for high volume data processing involving multiple locations, a single DS-1 unit and an IBM Selectric typewriter is a low cost replacement for the more expensive, conventional paper tape system comprised of an I/O device, a tape reformat and tape reader. And important additional savings are realized because a single DS-1 unit enables both transmission and reception of data up to the 2400 bit per second capacity of ordinary telephone lines. Further benefits include: Elimination of the physical handling of tape now required with paper tape systems. Tape reusability. Significantly less space requirement. Greatly reduced maintenance.

DIGI-STORE DS-1 SPECIFICATIONS

RECORDING MEDIUM	16-mm double-sprocketed magnetic tape
READING SPEED	Asynchronous up to 300 characters/sec
WRITING SPEED	Asynchronous up to 300 characters/sec
RECORDING DENSITY	66⅔ ch/inch, 20 characters/frame
RECORDING CHANNELS	Up to 8
MODES	Reading or writing, controlled from front panel or remotely
WRITE MODE:	
INPUTS	Data — 8 levels, parallel; synchronous or asynchronous character rate, 0-300 per set "0" = -8 to -12 volts "1" = 0 to -1 volt Strobe — Positive pulse, 6 to 8 volts in amplitude, at least 20 μ s wide, maximum rise time 10 μ s, must accompany each character group; leading edge of strobe must arrive at least 200 μ s after data levels are stabilized

READ MODE:	
INPUT	Step command (identical to strobe in WRITE mode) — Positive pulse, 6 to 8 volts in amplitude, at least 20 μ s wide, maximum rise time 10 μ s, must be supplied to request each character read-out; synchronous or asynchronous repetition rate 0-300 pps
OUTPUT	8 levels, parallel, and their complements "0" = -8 to -10 volts "1" = 0 to -1 volt Minimum load impedance: 3k
OUTPUT DELAY	Output levels are correct 3 ms after step command (strobe), and remain until next step command
TIGHT-TAPE INDICATION	Switch closure to ground
PACKAGING	Self-contained
WEIGHT	30 lb
SIZE	19½" d x 7" h x 8¼" w
POWER REQ., VOLTS	120, 60 cps
CURRENT DEMAND, AMPERES	0.75

BUFFER-STORE SPECIFICATIONS

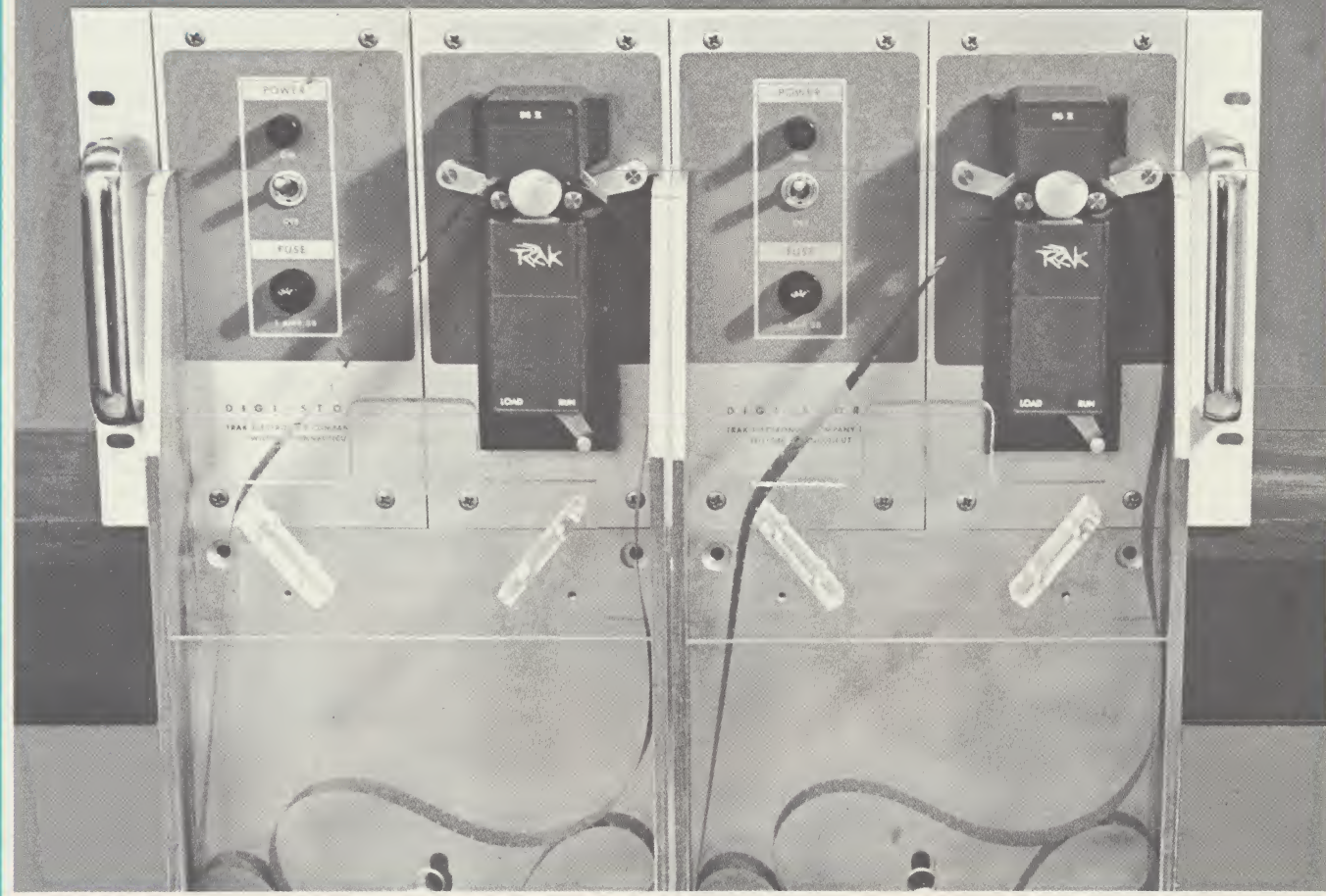
A Digi-Store Buffer combines two basic DS-1 units. When used in digital communications, it performs the function of a paper tape reperforator-transmitter-distributor.

CODE:	Any code of up to 8 data levels.
INPUT:	Parallel or start-stop serial at any rate to 3,000 wpm (300 characters/sec.).
OUTPUT:	Parallel or serial at any rate to 3,000 wpm, independent of input.
STORAGE CAPACITY:	Up to 40,000 characters on 50 ft. continuous loop.
MINIMUM STORAGE CAPACITY:	Zero. Last input character delivered to output.



TRAK ELECTRONICS COMPANY, INC.

59 Danbury Road • Wilton, Conn. • Tel. (203) 762-5521



DIGI-STORE* DS-2

FAST, BI-DIRECTIONAL, ASYNCHRONOUS MAGNETIC TAPE READ/WRITE UNIT

HANDLES ANY CODE UP TO 8 LEVELS

The new Digi-Store DS-2 outperforms and offers many advantages over paper tape punch and reader systems for automatic typesetting, Data-Phone* equipment, buffer storage, rate changing, direct computer input-output utilizing existing paper tape connections, telemetry, machine and test equipment programming, and other digital communications and data handling applications. Check these features . . .

- Single unit operates in either read or write mode at asynchronous speeds up to 333 characters/second (3330 wpm). A functional replacement for paper tape punch and tape reader.
- Completely reversible. Reversal time only 4 ms. Write-to-read recovery time only 50 ms.
- Packing density of 1000 characters/foot — over 8 times that of paper tape. Continuous 50-foot tape loop stores up to 50,000 characters.
- Solid state reliability. Designed for 19" rack mounting — up to 4 units per rack. Well-styled packaging

- also makes unit suitable for desk use.
- Parallel-to-serial or serial-to-parallel logic available. Modular construction permits variety of configurations to suit individual needs.
- Electrically compatible with standard paper tape systems. Eliminates tape bulk and chad disposal problems. Magnetic tape can be reused without erasing.
- Coded DS-2 tape has been used 46,000 times with no error in original coded message. (Test arbitrarily stopped at this point.)

*Trademark

REDUCES COST OF DATA-PHONE* INSTALLATIONS

The combination of a single DS-2 unit, an IBM Selectric typewriter serving as an I/O device, and special Trak control logic for marrying the DS-2 to DATA-PHONE* equipment is a cost-cutting replacement for commonly used paper tape systems employing more expensive I/O units, a tape reperfector and tape reader.

In such applications, the speed of the DS-2 enables maximum capacity utilization of the transmission line. The Selectric typewriter operates at 15 characters per second — one third faster than most similar devices. Also, as an extra benefit, the same typewriter can be used for regular office functions when the system is not on line.

The 16 mm double-sprocketed magnetic tape of the DS-2 can be reused *thousands* of times — a factor which quickly offsets the tape's higher initial cost as compared to paper tape, and results in important long-term operating



savings. In addition, less tape length is required because of the DS-2's higher packing density — and there is no nuisance of chad removal.

This Trak system of a DS-2 unit, control logic and typewriter is available in desk type and desk top models at considerably less cost than other equipment of comparable performance capabilities.

IDEAL FOR AUTOMATIC TYPESETTING

By replacing all paper tape operations in automatic newspaper typesetting systems, Trak Digi-Store DS-2 equipment enables input and output to and from a computer (used for justifying and hyphenating news copy) at much higher speeds than normally attainable. Once a typist has put a story on the magnetic tape of the DS-2, the recorded tape can feed the computer at speeds up to 333 characters per second — and computer output speeds of the same magnitude can be handled.

Because of these DS-2 capabilities, the computer can keep more line casting machines busy — and thus result in greater operating efficiency than is possible with paper tape equipment. The DS-2 features of higher recording density and tape reuseability are additional advantages.

In addition to automatic newspaper typesetting, DS-2 equipment is applicable to book, magazine and commercial typesetting.

DIGI-STORE DS-2 SPECIFICATIONS

RECORDING MEDIUM	16-mm double-sprocketed magnetic tape
READING SPEED	Asynchronous up to 333 characters/sec
WRITING SPEED	Asynchronous up to 333 characters/sec
RECORDING DENSITY	1000 ch/foot, 25 characters/frame
RECORDING CHANNELS	Up to 8
MODES	Reading or writing, forward or reverse, controlled from logic levels. Reversal time 4 ms. Recovery time, write-to-read, 50 ms.
WRITE MODE:	
INPUTS	Data — 8 levels, parallel; synchronous or asynchronous character rate, 0-300 per set "0" = -8 to -12 volts • "1" = 0 to -1 volt Strobe — Positive pulse, 6 to 8 volts in amplitude, at least 20 μ s wide, maximum rise time 10 μ s, must accompany each character group; data levels must be stabilized at least 200 μ sec before strobe

READ MODE:	
INPUT	Step command (identical to strobe in WRITE mode) — Positive pulse, 6 to 8 volts in amplitude, at least 20 μ s wide, maximum rise time 10 μ s, must be supplied to request each character readout; synchronous or asynchronous repetition rate 0-300 pps
OUTPUT	8 levels, parallel, and their complements "0" = -8 to -10 volts • "1" = 0 to -1 volt Minimum load impedance: 3k
OUTPUT DELAY	Output levels are correct 3 ms after step command (strobe), and remain until next step command
TIGHT-TAPE INDICATION	Switch closure to ground
MOUNTING	Standard 19" rack mounting
WEIGHT	33 lbs
SIZE	19" x 8 $\frac{3}{4}$ " x 12". Digi-Stores are available in pairs in a 19" x 8 $\frac{3}{4}$ " x 24" frame. Space is available in this package for additional logic cards.
POWER REQ.	120 v, 50-60 cps
CURRENT DEMAND	While idling: 0.7 amp At maximum speed: 0.85 amp

BUFFER-STORE SPECIFICATIONS

A Digi-Store Buffer combines two basic DS-2 units. When used in digital communications, it performs the function of a paper tape reperfector-transmitter-distributor.

CODE: Any code of up to 8 data levels.

INPUT: Parallel or start-stop serial at any rate to 3,330 wpm, (333 characters/sec.).

OUTPUT: Parallel or serial at any rate to 3,330 wpm, independent of input.

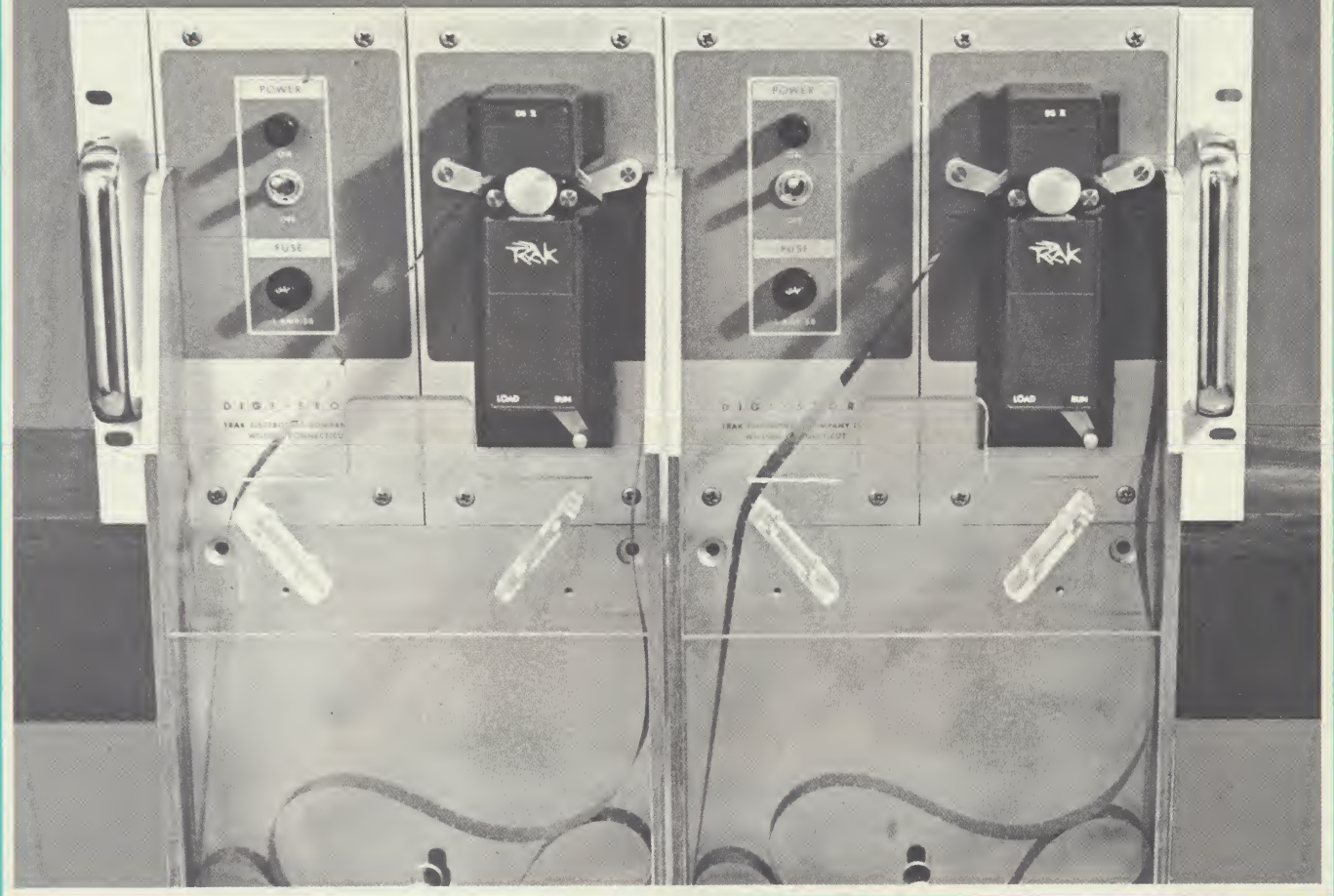
STORAGE CAPACITY: Up to 50,000 characters on 50 ft. continuous loop.

MINIMUM STORAGE CAPACITY: Zero. Last input character delivered to output.

*DATA-PHONE — Mark of the Bell System

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NEWS FOR IMMEDIATE RELEASE

TRAK Electronics Company, Wilton, Connecticut hereby submits another successful application of the DIGI-STORE® in the AN/GMH-4 Analysis Data Central System designed and built by the Friez Instrument Division of the Bendix Corporation. As illustrated by the photograph and described in the write-up provided by Bendix Friez, this is another example of the TRAK DIGI-STORE successfully replacing paper tape punch and readers in an operating system.

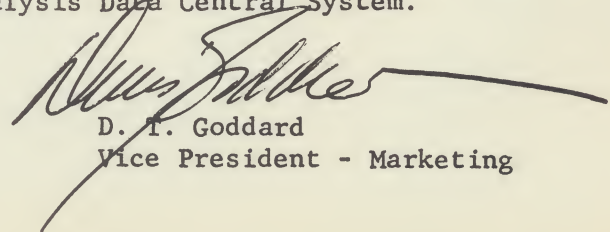
AN/GMH-4 Analysis Data Central

The AN/GMH-4 Analysis Data Central equipment was engineered by Bendix Friez Instrument Division for the Air Force W-47 Program. The program included the development of the Airborne AN/AMZ-19 Meteorological System which collects, stores, and transmits weather data to communications ground stations. The weather data is converted to digital form, stored in eight parallel channels in field data code format, and transmitted to the ground over the aircraft single side band radio as a multiplexed audio signal.

Processing of the weather data transmitted from the aircraft as a multiplexed audio signal must be accomplished through a ground data handling system which provides an automatic link between the communications single sideband receiver and a teletype system used to display the data and relay the information to other locations. The salient features of the ground data handling system, AN/GMH-4 Analysis Data Central, are as follows:

1. The system demodulates, converts, and presents raw weather data on a teletype page printer.
2. The system provides storage of the received data at the ground station for processing or re-transmission at a later time (up to a maximum of six transmissions).
3. The system provides for conversion of the digital message format from parallel NRZI field data code through parallel NRZ field data code to serial Baudot code format.

The buffer storage unit of the AN/GMH-4 system consists of two TRAK DIGI-STORE units mounted side by side in the rack with one operating in the write mode and the other in the read mode as required (the individual units have read/write capability). The DIGI-STORE units use 100% transistorized circuitry and a minimum of moving parts. The input and output speeds are asynchronous to 300 characters per second, and the units are compatible with teletype machines with no external adaptation. A third DIGI-STORE unit is employed as part of the self-test equipment of the AN/GMH-4 system. A pre-programmed test tape is utilized to test each channel of the Analysis Data Central System.



D. T. Goddard
Vice President - Marketing

